# RDS-2 / product 501-M

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**DATA AS OF 2019 (in progress)**
**RDS-2 / product 501-M**
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Atomic charge for the "501-M" bomb. The implosion-type charge with a new focusing system made of conventional explosive was created by Design Bureau No. 11 of the Measuring Instruments Laboratory No. 2 of the USSR Academy of Sciences (since 1950, the design bureau was transferred to the structure of the First Main Directorate under the USSR Council of Ministers). In some sources, the original name of the charge is "RDS-1M". By Resolution of the Council of Ministers of the USSR No. 1989-773 dated June 10, 1948, Design Bureau No. 11 was tasked with carrying out, by April 1, 1949, computational and theoretical studies on the possibility of creating RDS-3, RDS-4, RDS-5 charges and the RDS-6 hydrogen charge. The development under the name "RDS-4" (the fourth version of the first generation atomic bomb, the first such name) was started in 1948. After testing the RDS-1 atomic bomb, Yu.B.Khariton continued work on improving the RDS-1 design

. Tests. On August 24, 1951, two bombs, product 501-M (No. 30171 and No. 30176, *source - Report* ), arrived at site N of the Semipalatinsk test site. The ground test explosion of the 501-M bomb was carried out at the Semipalatinsk test site on September 24, 1951. During the tests, the correctness of the solution obtained by Soviet intelligence and the scientists developing the charge was confirmed.

Since November 1951, the bomb was renamed RDS-2 and, probably, its serial production began. On December 29, 1951, the Council of Ministers of the USSR adopted two top secret resolutions - No. 5384-2344ss/op "On ensuring the production of 501-M products" and No. 5383-2343ss/op on the expansion of Plant No. 551 - one of the reasons was to ensure the production of 501-M products. The resolutions stipulated measures to ensure the production plan for RDS-2 and RDS-3 products and the reworking of RDS-1 products in 1952. "Accept the draft Resolution of the Council of Ministers of the USSR "On measures to ensure the plan for the production of RDS-2 and RDS-3 products and the reworking of RDS-1 products" submitted by the First Main Directorate under the Council of Ministers of the USSR and KB-11 and reviewed by the commission consisting of Comrades Klochkov, Zavenyagin and Borisov. The increased production capacity of Plant No. 551 made it possible to manufacture 40 atomic bombs in 1952, including 24 RDS-2 type atomic bombs and 16 RDS-3 type atomic bombs. In total, as of January 1, 1953, 75 atomic bombs (59 RDS-2 units and 16 RDS-3 units) were manufactured and stored in KB-11 storage facilities by the experimental and serial production facilities.

In the first quarter of 1953, 501-M products were to be manufactured start operating a separate plant No. 418 (Resolution of the USSR Council of Ministers No. 3506-1628ss/op of 15.09.1951, Sverdlovsk-45, now the city of Lesnoy) with a capacity of 60 units per year.

Catalog
AIR
Bomber
Fighters
Transpo
Special
Helicopt
UAV
Air-to-ai
Air-to-g
Aircraft
Aircraft
Unguide
Aircraft
Bombs
Atom
Nu
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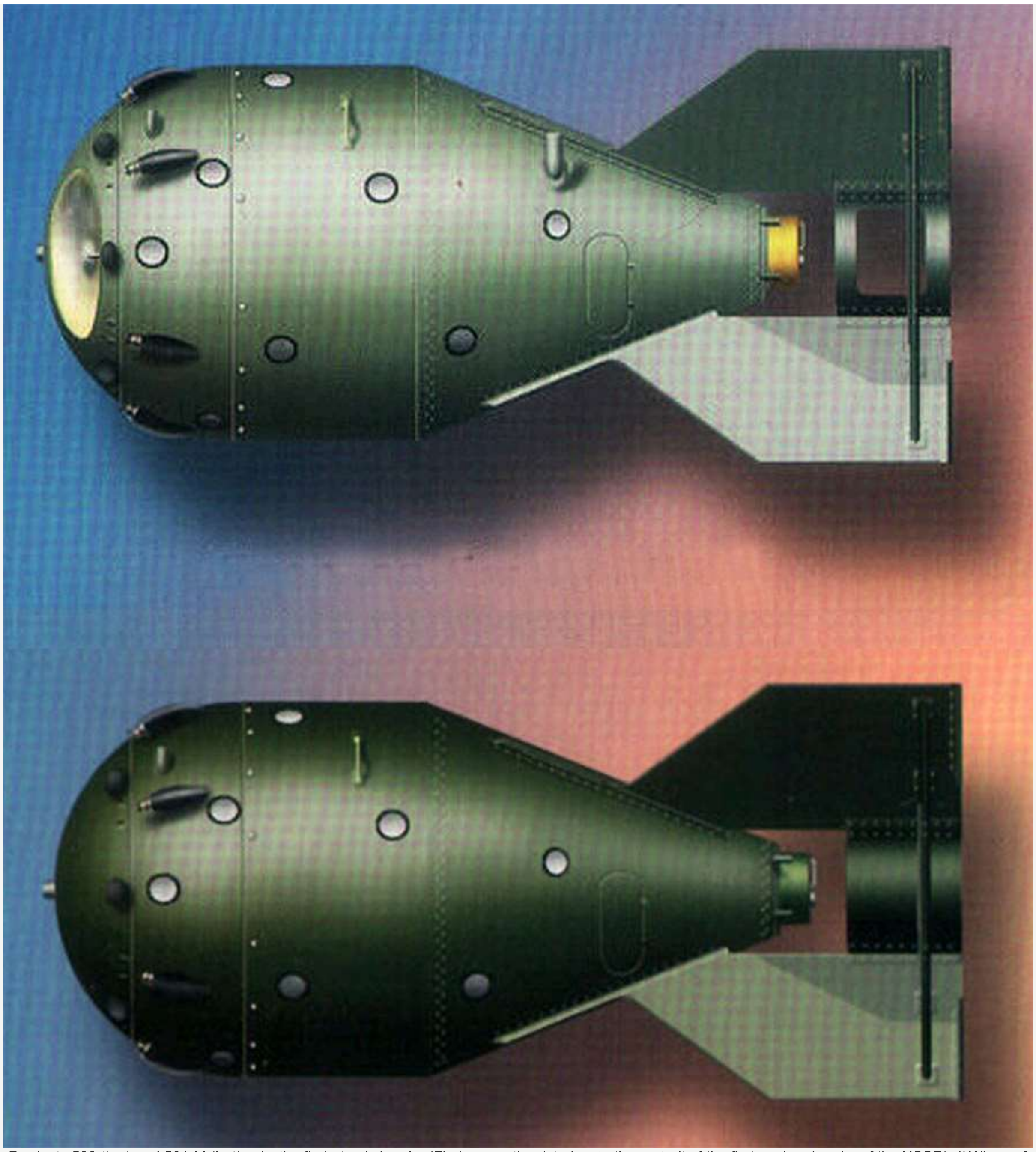

Products 500 (top) and 501-M (bottom) - the first atomic bombs (First generation (strokes to the portrait of the first nuclear bombs of the USSR). // Wings of the Motherland, No. 9 / 2008)

**Bomb performance characteristics** :
Length - approx. 3300 mm
Diameter - 1250 mm
Weight - 3100 / 3200 kg (according to various sources)

Power:
- 38 kt (during a test explosion on September 24, 1951)
- 30 kt (standard)

**Charge type** - an atomic charge made according to a shell-nuclear scheme, but the charge had a new, lighter focusing system. In the design of the RDS-2, one of the main geometric parameters of the RDS-1 charge was retained - the outer radius of the spherical charge of explosive (the same explosive as in the RDS-1 charges - a mixture of TNT with hexogen in a ratio of 1: 1 - TG 50/50). According to open data from the foreign press, inside the plutonium core of the charge there was a cavity (void) where tritium was placed, which also enhanced the explosion due to the fusion reaction ( source ).
The working substance is plutonium (Pu-239).

**Status** : USSR
- 08/24/1951 - the first test of the RDS-2. During the explosion, tests of the Tu-4 carrier aircraft were conducted in parallel to test the effect of the shock wave and other damaging factors from the explosion of an atomic bomb on a real aircraft. The tests were successful, which made it possible to proceed to the first real drop of an atomic bomb from a Tu-4.

- 10/18/1951 - the second test of the RDS-2 bomb and the first real drop of the 501-M atomic bomb from a Tu-4 aircraft. Many sources indicate that the RDS-2 bomb was tested, which is probably wrong, since the bomb in the 501-M case was tested, but with the RDS-3 charge .

- 09/14/1954 - during the first nuclear exercises at the Totsk test site, an RDS-2/501-M atomic bomb was used from a Tu-4A aircraft. The explosion power was 38 kt.

Production of bombs with the RDS-2/501-M charge:

| | Plant No. 551 | Plant No. 418 |
|---|---|---|

| | | |
|---|---|---|
| 1951 | 6 units | |
| 1952 | 24 units + 19 units from RDS-1 | |
| 1953 | from the beginning of the year to July inclusive 16 units were manufactured, including in July 1953 - 3 units ( source )<br><br>+ 10 units from RDS-1 | |
| 1954 | | plan - 40 units |

**Sources** :
501M (RDS-2, RDS-3). External appearance ( source ).
The atomic era of Russian aviation. M, "Stolichnaya Encyclopedia", 2019.
Report of I.V. Kurchatov and N.I. Pavlov to L.P. Beria on the progress of preparations for testing, August 28, 1951 // Atomic project of the USSR, v.2, book 7, p. 307
Chronology of indices of the first RDS. 2013 ( source ).

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